WHAT IS CLAIMED IS;

1. A vibratory mechanism comprising:

vibratory shafts, which are stored within a roll and are arranged symmetrically across a rotation axis of the roll;

a fixed eccentric weight fixed to respective vibratory shafts;

a rotatable eccentric weight rotatably attached to respective vibratory shafts;

a rotation controller controlling a range of movement of the rotatable eccentric weight; and

an eccentric moment controller which changes an eccentric moment around the vibratory shaft depending on a rotation direction of the vibratory shafts,

whereby the roll vibrates in all radial directions when respective vibratory shafts rotate in one direction, and the roll vibrates in a direction tangential to the circumference of the roll when respective vibratory shafts rotate in reverse direction.

2. A vibratory mechanism according to claim 1, wherein

a first vibratory shaft and a second vibratory shaft are stored in the roll, and the first vibratory shafts is arranged at 180° opposite position across a rotation axis of the roll with respect to the second the vibratory shaft, wherein

a total eccentric moment around the first vibratory shaft is substantially the same as a total eccentric moment around

the second vibratory shaft, when the first vibratory shaft and the second vibratory shaft are rotated in one direction, and

a total eccentric moment around the first vibratory shaft is substantially the same as a total eccentric moment around the second vibratory shaft, when the first vibratory shaft and the second vibratory shaft are rotated in reverse direction, wherein

the total eccentric moment around the first vibratory shaft is obtained by subtracting an eccentric moment of the fixed eccentric weight from an eccentric moment of the rotatable eccentric weight and the total eccentric moment around the second vibratory shaft is obtained by subtracting an eccentric moment of the rotatable eccentric weight from an eccentric moment of the fixed eccentric weight, when the first vibratory shaft and the second vibratory shaft are rotated in one direction, and

the total eccentric moment around the first vibratory shaft is obtained by adding an eccentric moment of the fixed eccentric weight to an eccentric moment of the rotatable eccentric weight and the total eccentric moment around the second vibratory shaft is obtained by adding an eccentric moment of the rotatable eccentric weight to an eccentric moment of the fixed eccentric weight, when the first vibratory shaft and the second vibratory shaft are rotated in reverse direction.

3. A vibratory mechanism according to claim 2, wherein

respective rotatable eccentric weights of the first vibratory shaft and the second vibratory shaft are allowed to rotate around the first vibratory shaft and the second vibratory shaft, respectively, within limits of 0 to 180°, and wherein

the eccentric moment around the first vibratory shaft of the fixed eccentric weight is substantially the same as the eccentric moment around the second vibratory shaft of the the rotatable eccentric weight, and

the eccentric moment around the first vibratory shaft of the rotatable eccentric weight is substantially the same as the eccentric moment around the second vibratory shaft of the fixed eccentric weight.

4. A vibratory mechanism comprising:

a first vibratory shaft and a second vibratory shaft, which are stored within a roll and are arranged symmetrically across a rotation axis of the roll;

a first fixed eccentric weight and a second fixed eccentric weight, which are fixed to the first vibratory shaft and the second vibratory shaft, respectively;

a first rotatable eccentric weight and a second rotatable eccentric weight, which are rotatably attached to the first vibratory shaft and the second vibratory shaft, respectively;

a first rotation controller, which is provided on the

first fixed eccentric weight and controls a first phase difference between the first fixed eccentric weight and the first rotatable eccentric weight depending on the rotation direction of the first vibratory shaft;

a second rotation controller, which is provided on the second fixed eccentric weight and controls a second phase difference between the second fixed eccentric weight and the second rotatable eccentric weight depending on the rotation direction of the second vibratory shaft.

5. A vibratory mechanism according to claim 4, wherein

the first rotation controller and the second rotation controller hold the first phase difference and the second phase difference at 0°, respectively, when the first vibratory shaft and the second vibratory shaft rotate in one direction, and

the first rotation controller and the second rotation controller hold the first phase difference and the second phase difference at 180°, respectively, when the first vibratory shaft and the second vibratory shaft rotate in reverse direction.

6. A vibratory mechanism according to claim 5, wherein

the eccentric moment to the first vibratory shaft of the first fixed eccentric weight is substantially the same as the eccentric moment to the second vibratory shaft of the second rotatable eccentric weight, and

the eccentric moment to the first vibratory shaft of the first rotatable eccentric weight is substantially the same as the eccentric moment to the second vibratory shaft of the second fixed eccentric weight.

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7. A vibratory roller having a vibratory mechanism of claim 1 in a roll.